Integrated Demonstration Break Out Group

Integrated Demos
Break Out Session

Goals for Today

- Consensus on integrated demo scenario (e.g., Future Combat Systems)
- Identify existing, relevant models and tools
- Identify principal players
- Determine what's needed that's not already available to PIs
- Others?

Integrated Demos

- PI Conference call Feb. 25, 2002
- Working groups
  - Scenarios - Baras
  - Controls / Transport - Rao
  - Validation - Ogielski (Predmore)
- Integrated Demos
  - SPAWAR (Dave)
  - Future Combat Systems (Baras)
  - Others?

FCS Scenario - John Baras

- Emphasis on Wireless/Hybrid networks
  - Heterogeneous
  - Multiple-paths
    - Affects Routing Algorithms
  - Intermittent Connectivity

FCS Scenario of Interest

- 4 to 5 Mobile Ad-Hoc Networks
- 3 to 4 UAV's
- 1 Satellite

On-Line M&S Proposed Use

- Decision Aid for allocation of new assets
  - When, where, if
- Decision Aid for power allocation
  - Maximum network lifetime
- Decision Aid for Protocols, Network Operating Parameters
  - e.g., Change Routing Scheme as Conditions Change

Needs and Challenges

- Distribution of software to PI's
- New/Better Mobility Models
- Models for directional antennas
- Traffic Models
- Military Workload Models
- RF Models
- Terrain Models

Needs and Challenges (continued)

- Creation of experiment/test manifesto
- Timing experiments to prove on-line usability
- V & V of experimental results
- Define and Establish Scalability

Needs for Proposed Experiment

- Better RF Models
- Better Data Flow Models
  - Who talks to Who
  - How much data
- OPNET models?
  - Difficult to interact w/ others
  - OPNET does have HLA interface
  - JavaSim also has HLA/Backplane I/F

Nikhil Dave - SPAWAR Demo Info

- Collect Operational Network Data
  - CoralReef (CAIDA)
- Simulate under varying conditions
  - OSC Framework (SAIC)
  - pdns (GaTech)
  - GloMoSim
- Graphical Representation of Network Performance
- Adjust Network Parameter Settings as Dictated by Simulation Results

Extensions to SPAWAR Demo

- Better measures of End-to-End Latency
- TCP enhancements for better performance over satellites

Nagi Rao (ORNL) - Network Transport Issues

- Host Based Methods
  - Buffer Tuning, Parallel Streams
  - End Filters, source shapers
- Network Based Methods
  - QOS
  - Overlay Networks

Instruments for Data Transport

- Tune Individual Streams
  - Buffer/window tuning, tcp variations
- Avoid Congested Paths
  - Routing adjustments
- Net-Lets
  - Application Level C code

Ad-Hoc Networks of Mobile Units (Robots)

- Existing Capability on ORNL
- Utilize mobility capabilities of Robots
  - Insure Reliable Message Delivery using cooperating robots

Proposed FCS Scenario, On-Line Simulation

- Need Data Collection, but FCS Networks do not currently exist
- Per Rajive, have existing real-time capabilities for 100 nodes wireless, mobile
  - Has been validated against actual systems
- Use existing SPAWAR Data Collection Capabilities
- Perhaps use 5 Robots w/802.11 from ORNL
- Use surrogate devices: laptops, handhelds, reach back to high performance computing

Issues

- Wide Area Distributed Simulation for development?
  - Not Likely
- Centralized Development Location
  - GT machines can be used
- Data Collection on SPAWAR Systems
  - Distribute Data to Simulation Sites as needed
- Sri: Can we get data on FCS scenarios already conducted? Upcoming JWID demo?

Summary

- FCS scenario demo; combine with SPAWAR(?)
  - Data
  - Simulators
  - Hardware (laptops, handhelds, HPC reachback)
- John Baras developing scenario manifesto (already started)
- If interested in participating, send email to fujimoto@cc.gatech.edu
- Conference call, 3 PM EDT Mon April 29